

To: P. Fred Heerbrandt, P.E.[fheerbrandt@wmfhillinc.com]
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From: Nesmith, Rodney
Sent: Mon 8/3/2015 3:43:19 PM
Subject: RE: Sediment sampling at the NOMA intake

Fred,

I am responding to your July 24 letter, sent on behalf of New Oxford Municipal Authority, regarding the finding of ^{40}K at the site of the Miller Chemical fire. I was not able to answer several of your questions, so I turned to our Radiation Protection Program for that information. I have copied Mr. Robert Zaccano, Radiation Protection Program Manager, in this e-mail string. If you have further questions about radiological concerns, we may need to seek that information from Mr. Zaccano and his staff.

From the Radiation Protection Program:

The Department is aware of three (3) loads of waste originating at Miller Chemical that alarmed the radiation meters at landfills. The first load entered Modern Landfill on July 2, 2015. Modern Landfill staff in turn surveyed the load and determined that the load contained Potassium-40 (^{40}K), which is classified as TENORM (Technologically Enhanced Naturally Occurring Radioactive Material). The second and third loads entered Mountain View Landfill on July 3, 2015. Again, staff surveyed the loads and determined that the loads contained ^{40}K .

TENORM is naturally occurring radioactive material not specifically subject to regulation under state and federal laws. TENORM has the potential to result in human exposure when the natural environment is disturbed by human activities. The isotope identified in waste from Miller Chemical, ^{40}K , is both naturally occurring and commonly found in nature as it is the largest source of natural radioactivity found in animals including humans. It has a long half-life of 1.25 billion years. Given its overall abundance and long half-life, it is not unusual for raw materials used by industry to contain ^{40}K . Similarly, it is quite normal for the water intakes to naturally have ^{40}K at some detectable level.

Given the complex clean-up taking place at Miller Chemical, the Department requested that both Modern Landfill and Mountain View Landfill submit an application to the Waste Management Program for a Form U approval to bury the waste. Both facilities agreed to begin the process and obtain a Form U approval. In addition, the Department discussed proper waste characterization, analysis and disposal options with Miller Chemical representatives. It is the understanding of the Department that they have conducted radiologic surveys as waste is generated to determine if any other unusually high concentrations of ^{40}K exist. However, we have not been informed of any additional occurrences.

In further discussions about the potential to impact public water supply intakes, I was told:

^{40}K , on average, makes up 0.012% (120 ppm) of the total amount of potassium found in nature. It is reasonable to expect that 0.012% of the potassium involved in this site was in the form of ^{40}K .

Radiation is all around us and in us, from the naturally occurring isotopes in the soil, water and air to the radiation that we receive from the Sun. Some things pose greater risks than other, like radon gas, due to the concentration in a dwelling. Some are found in our bodies, like ^{40}K and ^{14}C but they are in tiny amounts and are of no consequence biologically.

In further answer to the questions posed in your letter:

• The Department believes it is very unlikely that ^{40}K migrated off of the concrete pad and the Miller site in concentrations that would be either harmful or detectable above background for several reasons:

- 1) The material which was found to contain ^{40}K was in the center portion of the building which contained raw materials used for the production of Millers products. In order to get to that area of the building, over 400 tons of waste materials, approximately 20 loads, were disposed of without setting off radiation alarms at the disposal facilities. Given that that material was from the outside of the building pad, and did contain soils

which were impacted by the runoff, the likelihood that material was even washed off of the concrete is very small.

2) The majority of the raw materials were still in plastic bags and were still palletized, although some were damaged and melted. The bags were also under a portion of a roof, which prevented the worst of the rainfall from contacting the product, making the runoff potential very small.

3) The concrete pad for the building is sloped towards the center. As the building was being demolished and the waste removed, concentrated runoff and debris was collected from the center of the pad.

4) The majority of the most heavily concentrated water collected during the first several weeks after the fire was sent off site for solidification, and none of that material set off alarms on radiation detectors at the final disposal facility.

5) Once the raw material was determined to have naturally occurring radiation, the Department directed Miller and their consultants to bring in radiation detection equipment to use in monitoring the debris. They segregated any raw material that yielded results above background, ensured that it was covered and protected from rainfall, and eventually placed it into lined roll off containers for disposal.

- The Department intends to conduct additional Safe Drinking Water sampling within the NOMA sourcewater watershed prior to restart of the NOMA intake. Given current staffing capabilities and our understanding of NOMA plans, we are trying to conduct resampling during the week of August 10. In general, we plan to conduct additional sampling for all parameters of concern as a result of the fire, and intend to include sampling for ⁴⁰K. We do not intend to sample for contaminants not discovered during the fire. The exact sampling locations, times and parameters are not yet defined. When that plan is finalized, we will inform NOMA, Hanover Borough and York Water.

- The Department does not intend to require ⁴⁰K monitoring of NOMA. Information available to the Safe Drinking Water Program leads us to believe there is insufficient concentration and insufficient exposure via drinking water to warrant such a requirement.

- The Department does not intend to require NOMA to advise customers of the potential for ⁴⁰K in the watershed, or even at the intake, unless additional sampling or other information would indicate that the concentrations and exposures are substantially greater than those that have been reported thus far.

Thank you for your continued interest on behalf of NOMA. As the Safe Drinking Water Program develops its restart, watershed sampling plan, we will be in contact with the interested water suppliers.

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From: P. Fred Heerbrandt, P.E. [mailto:fheerbrandt@wmfhillinc.com]
Sent: Friday, July 24, 2015 3:36 PM
To: Nesmith, Rodney
Subject: Sediment sampling at the NOMA intake

Rod,

Attached is a letter discussing the collection of a sediment sample from the Conewago Creek at the NOMA intake.

I have also attached a letter concerning the discovery of a radiological source at the Miller site.

Have a nice weekend

Fred

P. Fred Heerbrandt, P.E.

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